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Analytics as an Isolating Mechanism for Start-Ups with Data-driven Business Models in the Health Care Industry

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I. Abstract

The following work investigates whether the competence of turning data into relevant information can make companies in the health care industry less vulnerable to imitation by other companies. The objective is to present a first overview of this topic and thus close a gap in the respective field of research whilst also providing a practical insight for the affected companies. Within the process of research, the pertinent theory on corporate strategy has been elaborated with the use of secondary sources. For the empirical results, founders and decision-making executives of seven relevant companies have been questioned. The work closes with proving the research question right.

Keywords: Corporate Strategy, Isolating Mechanism, Data Analytics, Health Care Industry

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1. Introduction

“To date, [*the*] health care industry has not fully grasped the potential benefits to be gained from big data analytics. While the constantly growing body of academic research on big data analytics is mostly technology oriented, a better understanding of the strategic implications of big data is urgently needed.” (Wang, 2015) The motivation of this work is to contribute to closing this lack of research by presenting one of the before mentioned strategic implications. Specifically, the question of this research is: Can the competence of collecting and analyzing data and turning it into relevant information serve start-ups within the health care industry in order to prevent their competitors from imitating their success? This work presents a first empirical overview of this topic, its aspiration is not to provide a general validity with statistical accuracy, which shall be reserved for further, more extensive research. The work focuses on start-ups specifically, based on the assumption that within the health care industry most of the companies focusing on data successfully have been in the market for a relatively short timeframe. That assumption will be proven right in the fifth chapter.

At first, the relevant theory on corporate strategy will be differentiated and outlined. Afterwards, the term “data-analytics” and its implications on today’s business models will be presented. Following, the health care industry with its characteristics and the implications of those characteristics on companies with business models that rest upon data to a large extent will be outlined. This part is based on both secondary research and the results of expert interviews with founders and decision-making executives of seven relevant companies. Then, the main results of this overall work will be given, presenting the motivation for the answer of the initial research question. This will be based to a large scale on the conducted expert interviews as well as on the insights of the previous chapters. A summary of the results of each expert interview, the questionnaire with leading questions, as well as the detailed transcripts in written form may be found in the respective annex to this work.

2. Isolating Mechanisms within the Resource-Based View of a Firm

According to Chandler (1962) business strategy is “the determination of the basic long-term goals and objectives of an enterprise”. As Henderson (1989) points out, businesses need strategy because they cannot grow infinitely. Just like in nature, they are surrounded by competitors and only the ones that adapt to their environment best will survive. Thus, a firm’s iterative process of defining a plan for the future and the implementation of its result are crucial in order to have an advantage over the rivals. Different opinions exist on where the focus shall lie within the process of strategy definition. The two most common opinions will be outlined below.

According to Porter (1996), strategy means conducting activities differently than the rivals do. In order to do so, Porter (1985) introduces three alternative generic options of strategy definition in order to distinguish a firm from its competition: Pursuing the goal of setting the lowest prices compared to the competitors (“Cost Leadership”), choosing one or more features that are relevant to the company’s buyers and emphasizing on these attributes differently than the competitors (“Differentiation”), or concentrating on a very narrow segment of buyers and tailoring the prices or differentiating their attributes to this fraction of the market (“Focus”). Thus, Porter’s definition of strategy focusses on the external environment of the firm and how the firm should position itself best within this environment in order to be different.

In contrast to this view, the theory of the “resource-based view” of the firm argues that an analysis of a firm’s external environment by itself is not enough for the definition of a successful strategy. (Barney, 1986) The main reason for this is that both the approaches of collecting information of the competitive environment and the models for its analysis will be available for all players in the market. (Barney, 1986) Hence, companies should focus within strategy definition on information they have exclusive access to – namely by turning inwards and looking at the resources they already control themselves. The term *resources* can here “include

all assets, capabilities, organizational processes, firm attributes, information, knowledge etc. controlled by a firm to conceive of and implement strategies that improve its efficiency and effectiveness.” (Barney, 1991) According to Barney (1986), those resources can be the basis of an advantage over the competition if the rivals do not have access to similar resources (the strategic resource base between the firm and its competitors is thus heterogeneous), and the respective resources are not perfectly mobile (implicating that heterogeneity is stable over time). If the second aspect is given, this may be called *sustained competitive advantage*. It is achieved if the firm implements a value-creating strategy that is unique to current or potentially new competitors, and those (potentially new) rivals are not able to reproduce the benefits of this strategy. (Barney, 1991) Thus, according to Barney (1991) a competitive advantage can then be called “sustained” if it resists over attempted duplication, and as a result of this retains over a longer, not specifically defined, period of time. Therefore, in order to have the potential of providing for a sustained competitive advantage, a firm’s resource must have all of the following attributes (Barney 1991): First, it has to be *valuable*, meaning that it allows to utilize opportunities in the firm’s environment. Second, it has to be *rare* to the firm’s current and potential rivals. Third, the resource has to be *inimitable* for the competition. And fourth, it must *not be possibly substituted* by an equivalent resource. Nonetheless, those valuable resources mostly only temporarily maintain their strategic importance. Unforeseeable changes in the industry structure, for example by new competitors entering the market, can lead to the condition that resources that were former sources of sustained competitive advantage become obsolete, or even develop to disadvantages over the competition. (Barney 1991) In order to preserve one of the above mentioned attributes, namely the *inimitability* of the resources over time and thus better sustain the competitive advantage given, so called *isolating mechanisms* may be identified and put in place. (Rumelt, 1984) An isolating mechanism is defined by Rumelt (1987) as “any knowledge, physical, or legal barrier that may prevent replication of the

value-creating new task, product, or service by a competitor”. Within the economic theory, according to Rumelt (1987), the most important isolating mechanism is *causal ambiguity*. This term describes that rivals are unable to fully comprehend the root of the firm’s success, since it is the result of the combination of resources, actions, cultures etc., and as such is impossible to be replicated. Nonetheless, following his broad definition of isolating mechanisms, Rumelt (1987) continues that isolating mechanisms in practice are a result of the nature in which a firm operates and therefore there will be “no unambiguous mutually exclusive list of these phenomena”. Some mechanisms Rumelt (1987) mentions are for example specialized assets, special information, reputation, and consumer and producer learning.

In the following paper, it will be examined whether the capability of collecting and generating relevant information out of raw data can both be considered a relevant resource for a competitive advantage and an isolating mechanism for selected businesses. The next chapter will thus give an overview over the term *analytics* and how it already is becoming one of the most important resources for several companies today.

3. Analytics and its Role as potential Source of Competitive Advantage

According to Schniederjans (2014), analytics is a “process that involves the use of statistical techniques (...), information system software (...), and operations research methodologies (...) to explore, visualize, discover and communicate patterns or trends in data”. Thus, analytics transforms raw data into applicable and relevant information. Analytics can be categorized into three types (Schniederjans 2014): Within *descriptive* analytics simple statistical methods are applied in order to describe what is included in a set of data. *Predictive* analytics tries to identify trends and relationships out of the dataset that were not identified in the descriptive analysis. An example for this would be to figure out the relationship (or the lack of relationship) between age, height, and gender on the sales of bananas. *Prescriptive* analytics then gives as a result a recommendation on how given, scarce resources can be used in the best way, given the

identified patterns in the dataset. An example for this would be to analyze how a restaurant can allocate its given marketing budget on various advertising channels in order to reach the most relevant potential customers. The question now is, how the capability of firms using analytics can serve as a source of competitive advantage.

Already in 1985, Porter described how information technology can give companies a competitive advantage. He mainly breaks it down to improving and linking tasks along the firm's value chain (the system of activities that are performed in order to create value) with the use of data, which then supports the respective cost or differentiation strategy. But also within the resource-based view, already in 1991, Barney described a possible effect on competitive advantage. He outlined that it is very unlikely that a computer system as a physical technology can serve as a source for sustained competitive advantage since it can also be bought by the firm's competitors. Nonetheless, if embedded into a firm's decision-making process, an interface between the manager and the computer system is created which can be classified as a socially complex system and thus possibly be inimitable. (Barney 1991) Today, with information technology becoming available to a very broad range of both consumers and businesses, analytics gains rapidly in strategic importance: "Organizations are competing on analytics not just because they can (...) but also because they should. At a time when firms in many industries offer similar products and use comparable technologies, business processes are among the last remaining points of differentiation." (Davenport 2006). He mentions Amazon as the best example of a company that steadily collects and analyzes data on their customers and the respective relevant information out of this to better understand which products they request at which time, for which price and in which quantity over their lifetimes. In this way Amazon improves their processes by reducing inventory and stock-outs, but also increases the quality of their service towards the customers and thus achieves an advantage over their competitors. This sounding like a big opportunity for firms to create a competitive advantage,

it has to be mentioned that it can also become a threat to those who fail to holistically implement analytics into their businesses, or simply start too late: “Digital is fundamentally shifting the competitive landscape in many sectors. It allows new entrants to come from unexpected places”. (Willmott 2014)

This now shows that analytics can indeed serve as a source of competitive advantage for existing businesses. However, in the last years we have seen the rise of multiple, very successful new businesses that do not only use analytics within certain parts of their business, but whose business models rely on data as “a resource of major importance” (Hartmann 2014), also called *data-driven business models*. As a foundation for the further comprehension of this work the next chapter presents the characteristics of one industry and which implications those characteristics have on companies that want to enter this industry with data-driven business models.

4. The Health Care Industry and its particularities for Start-Ups with Data-driven Business Models

The upcoming chapter will at first provide the definitions of the relevant terms “start-up” and “health care industry”. Afterwards, current characteristics and future trends for the health care industry in general will be outlined in order to better understand the results of the expert interviews that were conducted within this research. Finally, the opportunities and threats that derive for start-ups wanting to enter the health care industry with data-driven business models will be outlined on the basis of the answers of founders and executives of respective companies.

Start-ups can be defined as companies that find themselves within the early phases of their lifetime. Mostly the revenues of these companies are still low whilst costs for research and product development can be called relatively high. Thus, most start-ups need external funding in order to develop further and – if successful – face rapid growth.

The health care industry describes the accumulation of companies that offer goods and services in the field of health and medical care. (Ledesma, 2014) Overall, the industry is estimated to consume over 10% of the global gross domestic product and thus presents a very big industry. (Morris, 2016) In order to understand the health care industry better it can be further divided into six sub-industries as follows (Ledesma, 2014): First, the pharmaceuticals sub-industry that deals with the research, development, production and marketing of medication. Second, the biotechnology sub-industry engages in similar activities, yet using biological processes instead of chemical ones. Then, the medical equipment sub-industry is engineering and manufacturing medical instruments. Fourth, the distribution sub-industry represents the companies that engage in the distribution of the aforementioned products, being for example pharmacies or wholesalers. Fifth, the facilities sub-industry represents the companies and organizations in whose institutions patients are treated by doctors or nurses, this can be for example hospitals or medical practices. Last, the managed health care sub-industry consists of companies that intend to “reduce the cost of providing health benefits and improve the quality of care” (Ledesma, 2014), those are mainly health insurance companies.

The health care industry is changing fundamentally at the moment. (Morris, 2016) Reasons for the conversions are mainly demographic change and growing populations. “Increased life expectancy [...] will bring the number of people aged 65+ worldwide to over 604 million, or 10.8 percent of the total global population. That number is even higher in Western Europe (nearly 21 percent) [...]” (Morris, 2016) This will result in steadily rising cost of care and thus force the various involved companies as well as governments to increasingly provide for efficiency in treatments and in the countries’ health care systems themselves. (Morris, 2016) In the past, especially state-run health care entities have realized cost savings by improving their procurement, cutting labor costs or increasing their efficiency in parts of their value chains like record keeping. Future health systems and entities will have to consider analyzing and adjusting

whole business models in order to further cut costs for example by moving from “volume- to value-based payment methods that emphasize improved [medical] outcomes per dollar spent”. (Morris, 2016) An example for this would be to move from the organization of medical care that is built around medical departments and the specializations of doctors towards an organization that is built around the delivery of care for a specific disease in order to create long-term value for both the providers and the patients and thus save cost in the long-term. (Morris, 2016) Technological and medical innovations like the decoding of the human genome, high computing power and the rise of precision medicine are factors that on the one hand improve quality of care for example by making personalized care or the cure of chronic diseases possible. On the other hand, they also mainly increase total health care cost in the short term. (Morris, 2016) In addition, patients nowadays are getting more empowered. They are informed better due to broadly available information on the internet, for example on medication prices or reviews of hospitals. Moreover, they demand more individual treatment and the use of digital solutions in health care like they are used to as customers within for example the hospitality or banking industry. (Morris, 2016) Meanwhile, governmental regulation within the health care industry is intense. This largely affects the pharmaceutical and medical device sub-industries in terms of patient and product safety. Yet, with digitalization slowly gaining momentum also in the health care industry, regulations on data and cybersecurity are increasingly gaining importance. (Morris, 2016) For example the ongoing discussions about which fitness and medical apps for consumers’ mobile devices fall under the EU regulatory framework for medical devices indicate this. (European Commission, 2014)

Also the companies that were interviewed within this research mentioned the legal perspective as one major factor to look at when talking about the particularities of the health care industry for start-ups that want to enter with data-driven business models. The health care industry is characterized by **tight regulation**, which may – depending on the business model – be given

by a large group of relevant stakeholders like data protection agencies, ethics committees of hospitals, or governmental health care agencies. (Case #1) This leads to relatively long times to develop new products and launch them within the markets. (Case #1) This long development time enlarges the capital needs for start-ups in the health care industry in comparison to most other industries because it takes a longer time until own revenues can be realized. (Case #5) Furthermore, when speaking of data-driven business models, it is hard for the companies to evaluate a priori which data is sensitive or not and thus may be subject to regulation. (Case #4) The heterogeneous environment of regulations on health care products and data protection especially between European countries also adds complexity and an extra hurdle for start-ups who want to enter multiple markets. (Case #4)

The **personal dimension** of data within health care on the one hand increases the amount of given and relevant data as such since every patient, and thus his data, is highly individual. Moreover, because of this personal affection the importance of health care as a service is higher in comparison to other industries which adds a great value to the respective data and especially to the information that is created out of this: “For example, when there is an economic crisis and people give up on buying new cars, the last thing they will give up is their children’s health. So, there is an intrinsic value to the data in health care.” (Case #1) Meanwhile, this personal dimension of data within health care adds complexity to the realization of data-driven business models: “Everyone is comfortable to have his financial information where he does not know where it is, but when it comes to clinical information, people tend to see things differently and they get concerned with the fact that they do not know where their data is stored.” (Case #6)

When talking about the **industry structure**, in most parts of the health care industry large parts of market shares are dominated by few big and established companies which are hard to compete with for small start-ups. (Case #2) Thus, competition within the industry itself cannot be described as very harsh, for example companies providing information technology solutions

for medical facilities are reported to sell the same products with little modifications for up to 15 years, since the competitive landscape does not demand perpetual innovation. (Case #5) Yet, this structure might not pose a threat to the incumbents within the industry, it certainly does present a massive entry barrier for start-ups with very limited resources to enter with new business models and compete with the big players. (Case #4) Nonetheless, it reflects big opportunities for innovative products especially within the data-driven world, since most big companies in the health care sector are “not exactly technological saviors” (Case #5).

Start-ups wanting to enter the health care market with apps for patient’s mobile devices should expect that **adoption** of new apps is harder for health care start-ups than for companies in other industries. The reason for this is that the group of people that are currently keen to use apps within their daily life are not so likely to actively use health care apps because they do not need it yet given their age and physical condition. Meanwhile, they would more likely adopt an app for managing their financials or public transportation. (Case #4)

Concerning the customers within the health care industry it has to be mentioned that doctors, who in large parts of the health care industry are direct or indirect customers, often constitute a **conservative group of buyers**. (Case #1) Especially when talking about data-driven products or services, it is difficult to convince doctors of the advantage they have by changing their working processes or patterns. (Case #5) On the one hand, this makes it hard for start-ups to sell new products and gain market share. On the other hand, once a start-up has gained a doctor’s trust, this mechanism is working in favor of the company by presenting an entry barrier for companies that try to copy the respective business model. (Case #1)

All in all, start-ups with data-driven business models face within the health care industry the tension between many opportunities and threats alike. On the one hand there are many market possibilities given by the need to cut cost in the system (and data and analytics as means to do

so) as well as patient demands for individual medicine. On the other hand, they have to deal with tight regulations within both the medical and data sector as well as complicated industry and buyer structures.

5. Ways in which Analytics is used as Isolating Mechanism by Start-Ups with Data-driven Business Models in the Health Care Industry

The following chapter points out the results of the expert interviews that were conducted within this research and merges them with the outcomes of the previous chapters. Thus, it will be outlined in which forms data analytics can serve as an isolating mechanism for start-ups operating in the health care industry with data-driven business models. The following list does not claim to be exhaustive nor statistically accurate, it represents a first overview of the topic in order to be able to answer the initial research question.

The more often companies with data-driven business models have their products or services used by customers, the more data they produce and process. This can be called “**traction**”, as the founder and CEO of Case #1 puts it. He founded a company providing a digital tool that allows doctors to make clinical decisions based on the patients’ genomic data in real time within an appointment in medical facilities. This expert claims that the company’s competitive advantage lies within the way they took the doctor’s perspective within the design of their solution. The information which is delivered to the doctor in order to allow for a decision, for example a certain medication, is translated into human, clinical language. This enables the company to deal with the entry barrier of conservative doctors that are unlikely to adapt to a new technology and thus ensures that the customer base and the usage of their product grows. Since this becomes only possible given the analytics capabilities of the company, the CEO states “the reason why we are successful right now is that we did something with analytics that the customers like, so the doctor” (Case #1). Yet, the way that the capability of performing data analytics serves as an isolating mechanism in order to prevent companies from imitating the

competitive advantage is that the more traction the company gets, the more expensive it gets for other companies to replicate this. And it gets more expensive because those competitors would either have to increasingly invest own resources in order to get to the point where the company is at that moment, or they would have to pay an increasing price should they consider buying the company. “The million dollar question for us is: Can we move fast enough so that when the big players decide to do it this way – they will buy you, instead of doing it themselves. So, can we evolve fast enough that when the bigger players decide to do it, they will buy us?” (Case #1). Thus, his company potentially being bought by one of the bigger players present in the industry does not pose a threat to the CEO. It represents a possible future growth opportunity for his business model and a way to escape the threat of companies trying to replicate its competitive advantage.

Start-ups within the health care industry can use analytics in order to **realize a unique value proposition** of their highly data-driven business model. This means that analytics makes it possible to have for example a feature within their digital products that their competitors do not have, which makes the customers prefer their product over the ones that are comparable. For example Case #4 operates in the broader medical equipment sub-industry and developed an app that allows patients to get an appointment with a doctor of their choice at a location of their choice. Thus, basic medical services can be provided for instance at the patient’s homes. This is convenient for example for parents who need the consultation of a doctor but cannot leave their houses because they have to look after their children. According to the founder and CEO, the product faces direct competition. Nonetheless, he states that his platform has two features that make patients choose his platform over the competition. First, it is the only one that makes it possible for the patients to choose a doctor of their choice and not have one allocated by force by the app: “[...] we want you to choose a doctor, and be able to keep that connection to the doctor. Which is important because the doctor has to know the medical history of a patient and

you can rely on the same doctor if he did a good job.” (Case #4). Second, he states that the app itself is easier to use and thus more likely to overcome the health care industry barrier of little adoption. Both of these features are enabled by the company’s predictive data-analytics capability as follows. The unique algorithms and growing data basis allow an increasing optimization of proposing a match between patients and doctors with each other according to for example the patient’s demographic data and the doctor’s medical specialization. This makes a satisfying selection of a doctor possible for the patients. And then, collecting and analyzing data on the usage of the app itself allows for the continuous improvement of the app by for example getting rid of redundant information and thus simplifying the use of the app for the patients. So the analytics capability of the company is what enables the possibility to have unique product features and prevents from having other companies replicate this company’s competitive advantage.

Similar to the point of a unique value proposition, analytics can enable a **digital value added** to a tangible product that provides for a competitive advantage and prevents other companies from copying this success. This means that companies selling manufactured products can add digital features connected to this tangible product which makes the product more valuable for the customers. This happens for example when the data which is generated during the use of the tangible product is analyzed and then provides information to a doctor who can come to a clinical decision upon this. That is done by Case #2, a start-up producing a smart pill dispenser that is connected to medical software and adjusted to the individual patient’s needs. The product is directly sold to the distribution sub-industry which then sells it to the patients. It mixes potentially multiple medication in the correct dose and reminds the patient on taking it at the right time. Even though the product is of tangible nature, the company’s business model can still be called data-driven: According to the business development manager who is responsible for the company’s business in Europe, there are competitors producing pill dispensers that seem

similar at first glance. However, the competitive advantage comes from the back feed of the data on the patient's usage of the pill dispenser, and its informative value that it proves to the doctor: "[...] we can generate information out of this data that nobody else can. Which is the behavior of the patient outside of the hospital and the pharmacy. [...] It is very important for the doctor to include that information in the patient's profile in order to give the doctor a basis for decision making for the further treatment." (Case #2). Since the doctors as a conservative group of stakeholders have to be convinced to recommend this product to their patients, this feature is critical for the success of the company. Thus, the capability of performing data analytics connected to the tangible product is what constitutes a barrier for the replication of the success of the company.

The collection and analysis of data that is generated with the usage of a company's product might allow for a **change of the business model** as soon as enough data is generated. The most obvious example of a different business model is to then focus the business activities on selling the information to other sub-industries within the health care industry. For example to insurance companies who could use relevant information of prescriptive analytics in order to optimize their premiums or to provide for value-based payment solutions. This competitive advantage gets very hard to imitate especially within the health care sector since the data is individual-related and thus unique by default. For example Case #6 is a company offering software-as-a-service for process management and information sharing within image based diagnostics. Thus, the value the company is providing to its customers (small to medium sized hospitals) lies within the handling of increasing volumes of imaging data, hence for example X-Rays or ultrasound data. Meanwhile, through processing this patient-related data the company is able to create valuable information out of it like demographic tendencies for the health of the population. And at some point, this could allow the company to prevent other companies from imitating its success by changing their business model towards selling this valuable

information: “So we want to grow at least 50% more before we think we have enough data so that it can be called accurate statistics. But once we have it, we are planning on using it as a business. Selling the information to pharmaceuticals or giving it to our customers. [...] A different player who does not have this data, even if he is bigger than me, it would be hard for him to compete with the value that we have.” (Case #6). As the founder and CEO puts it, the ability of performing data analytics hinders especially the bigger companies, of whom many are present in this industry, from copying the start-up’s success.

Data-analytics can sustain the inimitability of a company’s success if the business model is based on **complex analytics-technology** that cannot be copied without the associated know-how and without infringing respective patents. For instance Case #5 is a company that develops an augmented reality software that processes videos produced during surgeries with guided cameras and thus operates within the medical equipment sub-industry. The processed video supports the surgeon in real time with relevant information, for example at which part within the human body he should cut during the surgery. According to the founder and CEO there are currently no direct competitors because the algorithms the company developed in order to extract “meaningful information from an image” (Case #5) are on the one hand patented. But on the other hand they are simply so complex that they are useless to the customers without the respective knowledge on how to analyze the videos and turn it into the information that is valuable to the surgeons. This capability of performing data-analytics that the company accumulated in the development of this highly specialized product is what prevents the replication of its products by other companies. As with Case #1, the CEO of Case #5 claims that selling his start-up to a bigger company might become an option at some point: “[...] we never felt the tendency of copying us. Because it is complex technology and you are dealing with big companies, and if they are interested they will just buy you.” (Case #5).

Start-ups in the health care industry can use data-analytics in order to further **improve their products**, hinder other companies from keeping up with imitating their success, and thus increase their competitive advantage if this lies within product specifications. This is done for example by Case #7, a company creating methods to detect microorganisms, mainly within the human stomach. As outlined by the co-founder, there are competitors within the market in the form of companies offering different methods on performing the respective tests to detect microorganisms. Yet, the advantage of the company lies within a technological innovation that allows the company to perform this test within three hours, instead of 14 days as the competitors. Despite patents on this technology, the company actively collects and analyzes data on the usage of the product, at the moment within clinical trials. This information shall then be used in order to further improve the technology and the process of using it, as well as within advertising the product better to the potential buyers and demonstrating the benefits of this solution and thus expanding market share.

6. Conclusion and Outlook

As we have seen throughout this report, analytics indeed can serve as an isolating mechanism within various forms for start-ups with data-driven business models in the health care industry. The external forces within this industry are very much similar for all the companies that were questioned within this research, even though they were operating in different sub-industries with very different business models. Thus, the factors that influence the way in which data analytics serves as an isolating mechanism lie within the internal environment of the company, like the resources the company relies on and which it has to protect from imitation, and the nature of the product or service that is delivered. The difference between various resources becomes visible for example when looking at tangible and non-tangible products within the previous chapter, and the fact that tangible products are easier to be protected by patents than purely digital products.

Consequently, from the results of the interviews that were conducted within this research one can finally conclude that the more data-driven and the less focused on tangible products the business model is, the more effective data analytics becomes as an isolating mechanism, and the more actively it is used as one by companies with data-driven business models in the health care industry.

In order to provide an answer on the question that is generally valid and statistically accurate, further research based on the first results that have been presented here should consider a much bigger sample of questioned companies. As a result of future investigation, a model should be developed that organizes the surveyed companies into clusters based on the level in which their business models are data-driven. By this the cascading importance and the varying applications of analytics as isolating mechanism could be outlined more accurately. The results of this work presented here may serve as the basis for the setup of a respective questionnaire with closed questions. Moreover, future research should ideally consider geographical differences in order to be able to accurately answer the research question for various markets. Also, it would be interesting to figure out which other isolating mechanisms are most powerful to be combined with analytics as an isolating mechanism. One possibility of pairing it with the filing of intellectual property has been outlined within this work in Case #5 and Case #7. In addition, further investigation should not only limit on how data analytics is used as an isolating mechanism by data-driven business models in the health care industry today. It should go further and analyze how companies deal with these factors in other industries that have gained more momentum within digitalization already, like the media or communications industries. Commonalities between the business models of those companies and the companies in the health care industry should be identified. Thus, respective possibilities of using and improving analytics as an isolating mechanism in the health care industry could be adapted in order to actively strengthen the competitive advantage of those start-ups in the future.

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